

index

A

absorptance, 10, 98
active heating systems, 9, 13, 14, 21-24, 53, 56, 84
air infiltration; see infiltration
air loop rock storage; see rock heat storage
air mass, 18
albedo, 57; see also reflectance, ground
Anchorage, 20, 60, 101, 128
Annette, 40, 44, 114, 129
ASHRAE, 103-104
azimuth, solar, 53-55, 120

B

Barrow, 20, 41, 45, 61, 114, 130
batteries, 32, 36-37
beam radiation, 10
Bethel, 20, 41, 46, 62, 97, 114, 131
Bettles, 46, 63, 132
Big Delta, 20, 26, 47, 64, 114, 133
British Thermal Unit, BTU, 9
Building Load Coefficient, BLC, 103-106

C

calorie, 9-10
charge controller, 32, 36

climate effects, 94
coefficient of heat transmission; see U-value
collectors, 9, 14, 21-25, 41-44, 54; see also orientation, liquid-type, concentrating, evacuated tube, parabolic, flat-plate
computer simulation, 41-42
conduction, 10, 11
convection, 10, 11; see also infiltration
Cordova, 83
cost, 26-27, 31-34; see also economics

D

daylighting, 12
degree days, 104-106, Appendix A
Delta Junction; see Big Delta
diffuse radiation, 10

E

economics, 26-28, 31-35, 45-53
electricity, 12-13, 31-39
elevation angle, 15, 101-102
energy storage, 25-26, 27-28
evacuated-tube collectors, 23-24

F

Fairbanks, 15, 20, 25, 41, 47, 53, 56, 67, 88, 95, 102, 115, 135

f-chart, 41-42, 44-53
flat-plate collectors, 21-22, 27-29
Fort Yukon/Venetie, 68

G

Galena, 69
Glaubers salt, 27
glazings, 10, 13
Glennallen, 70
greenhouses, 10-11
greenhouse effect, 10
Gulkana, 41, 48, 115

H

Healy, 71; sunpath, also Denali Park
heat loss, 26, 87-91; see also conduction, convection, insulation, radiation
heat gain, 26
heat storage, 9, 25-26
Homer, 41, 48, 72, 115
Hubbert, M. King, 6
"Hubbert" curve of oil production, 6

I

infrared radiation, 9-10
infiltration, 107-108
in-slab heating ("panel heating"), 84

insulating shutters; see shutters, thermal

insulation, 87-89

inverters, 32, 37

J

Juneau, 41, 49, 73, 115

K

Kenai, 78

King Salmon, 20, 41, 49, 74, 116

Kodiak, 41, 50, 116

Kotzebue, 20, 41, 50, 75, 116

L

liquid-type collectors, 21, 24, 42-43

Lovins, Amory, 8

M

Matanuska, 41, 44, 51, 56, 96, 116

McGrath, 41, 51, 117, 140

movable insulation; see shutters, thermal

N

Naknek, 74

night insulation; see shutters, thermal

Nome, 41, 52, 77, 117

Null Energihuset (Danish zero energy house), 29

O

orientation of collectors, 53-55

orientation of structures, 53-55

overhangs, 100-102

overheating, 100-102

P

Palmer, 60

passive heating systems, 9, 13-14, 24-26, 87-106

"Peak oil", 5-8

Petersburg, 79

phase-change materials, 25

photovoltaic cells, 12-13, 31-39

photovoltaic home applications, 31-39

R

R-values, 88-89, 92-94

radiation, 9-11, 13, 15, 94; see also diffuse, direct, infrared, reflected, and ultraviolet radiation

reflectance, ground, 57-58, 104-105

retrofitting, 22

rock heat storage, 27-28

S

Saskatchewan Conservation House, 30

seasonal heat storage, 28-29

Seldovia, 72

shading, 55, 57, 100-103

shutters, thermal, 14, 87-93

Sitka, 79

snow cover, 57-58, 103

solar absorptance; see absorptance

solar constant, 9

solar heat gain, 90-92

space heating, solar, 9, 53

SOLMET, 41, 113-117

storage, energy, 9, 25-26, 27-29; see also heat storage, water heat storage, rock heat storage, phase-change materials, seasonal heat storage, electrical storage

Summit, 41, 52, 117

sunpath diagrams, 59-83

superinsulation, 85-92

T

Talkeetna, 80

Tetlin, 81

thermal mass, 88-90

thermal radiation, 9-10

tilt angle of a collector, 14, 42, 53-54

Tok, 81

topography effects, 55, 59

TRNSYS, 88

Trombe wall, 94

U

ultraviolet radiation, 9

Unalakleet, 82

Unalaska, 66

U-value, 105

V

Valdez, 83

Venetie, 68

W

water heating solar, 13-14, 41-53

water heat storage, 27-28

wind, 99-100

Winning the Oil Endgame, 8

windows, 87-103; see also glazings

Y

Yakutat, 41, 53

Z

zero-net-energy house, 8, 29